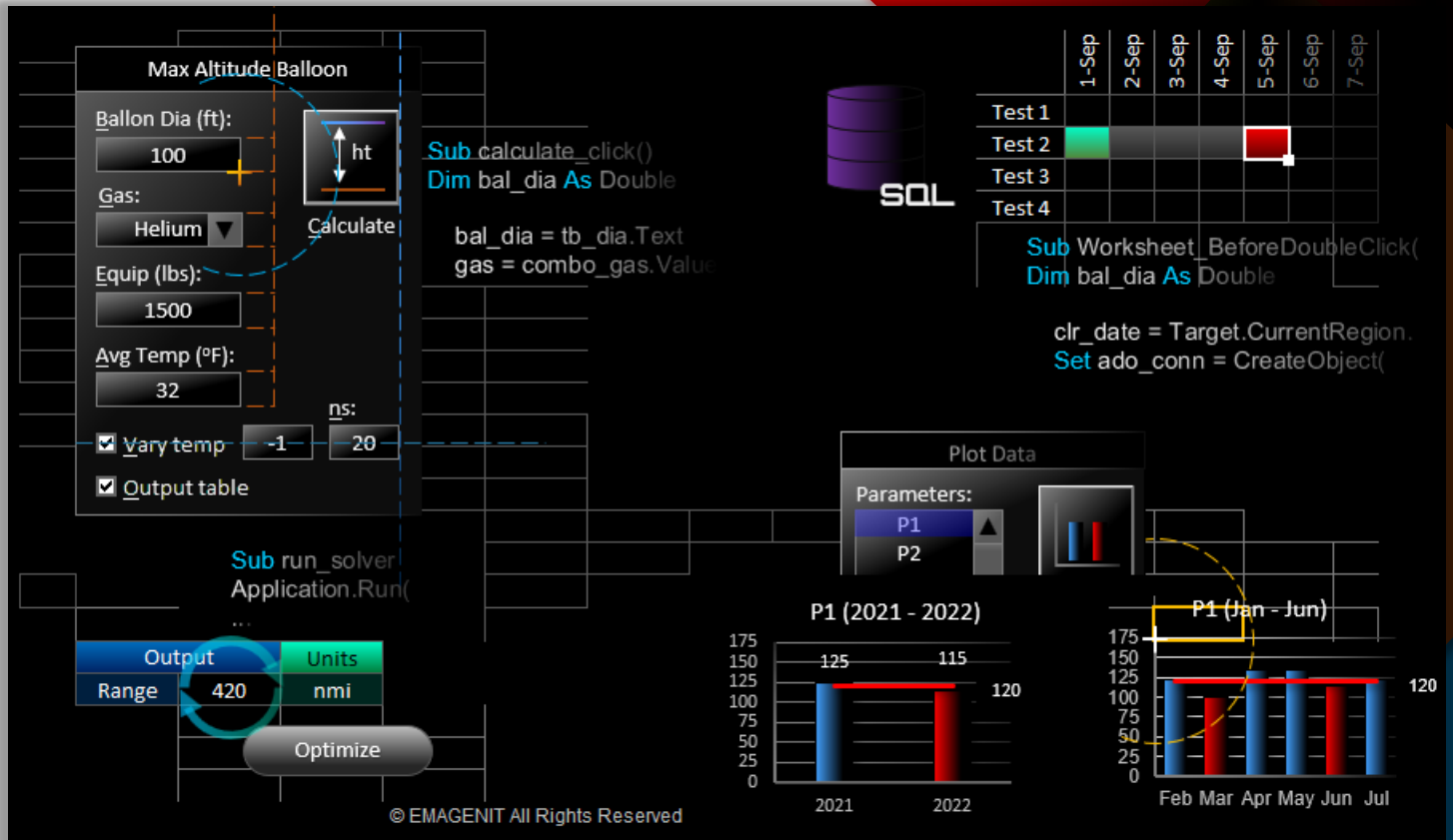


Advanced Excel VBA

for Engineers and Scientists



Unlock Excel VBA's full potential and develop the hi-tech tools that fit your needs. Learn to command the advanced features of Excel VBA to create powerful analysis, modeling, data, and visual display tools for engineering and science.

How our class can help you.

Our 3-day class shows you hands-on how to combine key Excel VBA elements to create advanced Excel apps for engineering and science. It covers essential topics like folder, file, workbook control; scanning folders for data; and processing complex worksheet data patterns.

Also discussed is advanced chart automation; text file control; and advanced report generation using Excel's data tools and the Analysis Toolpak.

In addition, it covers how to create advanced GUIs using the worksheet, events, ActiveX controls, charts, shapes, and userforms. It also covers advanced model construction; automating trade studies and Solver; database access and control with VBA; and the basics of automating Word, PowerPoint, and Outlook.



Examples of what you'll learn.

Who should attend the class?

Engineers, scientists, and technicians. Class examples will be determined by those in attendance.

Minimum Excel skills needed for the class.

Select this Excel training if you or your group have:

- Used the Excel VBA language in a basic capacity
- Used variables, loops, and logic before and know how they basically operate
- Used objects, properties, and methods before in code to control a program
- Used Excel drawing shapes and built charts manually
- Built basic worksheet formulas (=A1+A2) and used worksheet functions like SUM, MATCH, COUNTIF, COUNTA...
- Used Excel's data processing tools like Autofilter, Sort, Remove Duplicates, and PivotTables



How we run the class.

We focus our training on what our customers need. When training begins, we analyze those needs and shift our outline appropriately. We will stress or add topics that our customers want.

Class formats and signup.

In-Person, Virtually, and Onsite. Our live hands-on classes can be attended virtually or in-person. Please visit our public signup page for [class times and pricing >](#). Contact EMAGENIT directly at 805.498.7162 for more information about our onsite.

Key Excel VBA topics covered in class.

- Tracking and creating objects, using various arrays, and running events in VBA
- Methods of controlling workbooks, files, and folders in an advanced Excel app
- Advanced report automation using Excel's data tools and the Analysis Toolpak
- Using loops, logic, functions, and ranges to process complex worksheet data patterns
- Using Excel VBA to read, write, parse, and output text file data
- Advanced chart automation (formatting, limit lines, curve fits, combined charts, data labels, shapes...)
- Automating advanced models; model uploads / downloads; UDFs; performing trade studies; automating Solver
- Constructing advanced worksheet GUIs for your apps using VBA, events, shapes, worksheets, charts, and ActiveX controls
- Constructing advanced GUIs using VBA; userforms; events; the Ribbon; file / folder pickers; and ActiveX controls
- How to process engineering / science data in multiple folders, workbooks, and worksheets
- Using Excel VBA and shapes to build and dimension technical illustrations on the worksheet
- Status tool design using Excel VBA, worksheets, shapes, and cells
- Using SQL, ADO, and VBA to control and query databases, text files, and workbooks
- Basics of using Excel VBA to control Word, PowerPoint, and Outlook for report generation purposes

Detailed class syllabus.

Day-1

Advanced Excel VBA Language and Object Topics

*** This section is discussed when needed in the class.**

- Advanced debugging methods for Excel App development
- Using Excel and VBA element object modules for events
- VBA array control and using the ArrayList object in your code
- Tracking objects in your code using the Set statement and For...Each Next loops
- Using the Run method, concatenation, and logic to execute macros on the fly
- Creating your own objects using Class modules, procedures, and public variables
- Using the CreateObject / GetObject functions to create and track objects in VBA

Advanced Folder, File, and Workbook Control Using Excel VBA

- Overview of using the FileSystemObject to control the Windows folder and file system
- How to test for folder and file existence in your VBA code using FolderExists, FileExists...
- VBA methods for creating, moving, copying, and deleting folders for your Excel apps
- Controlling your data storage workbooks using Open, Close, Save, Add, and SaveAs in VBA
- Using concatenation and key functions in VBA to build workbook paths and file names

- VBA methods for storing and retrieving workbook data in a multi-user, high demand environment
- How to build a file / folder picker for your Excel apps

Advanced Report Generation Using Excel's Data Tools and Toolpak

- VBA methods for determining where datasets start and end on a worksheet
- Looping Autofilter, Sort... in your macro code to rapidly filter large datasets
- Using VBA macros to copy, paste, and stack filtered data on multiple report worksheets
- Using loops, logic, and functions to create multiple PivotTables and Pivot Chart reports
- Automating the Analysis Toolpak to process your engineering and science data

Using Loops, Logic, Functions, and Ranges to Process Complex Data Patterns

- Tracking complex worksheet data ranges, headers, data position... in your code
- Using the Math, Statistical, and Lookup functions in VBA to analyze complex datasets
- Reading ranges into VBA arrays for max processing speed
- Using loops, logic, and functions to process stacked tables, table fragments, indented tables...
- Using loops, logic, and functions to find max, min, steady state... values in data
- Using Excel VBA to fill in various advanced worksheet table patterns; outputting arrays to the worksheet
- Inserting worksheet rows / columns in your data tables and auto filling them with formulas or data

Advanced Chart Design and Automation

- Combining charts, shapes, and Conditional Formatting to make visual displays
- Changing chart ranges with VBA and loading VBA arrays as source data
- Using macros to create and format charts like xy scatter, column, pie, combo...
- Using VBA to create chart limit lines, color data points, hide /display series, build curve fits...
- Adding multiple tables to a chart using VBA
- Using VBA to create and arrange multiple charts on a worksheet
- How to use Excel VBA to create trade study plots

Creating, Reading, and Parsing Text Files with Excel VBA

- Automating Text Wizard and Text to Columns to import text data on the worksheet
- Using the Text Stream object to open, read, write... text files in your Excel VBA code
- Rapidly loading text file data onto the worksheet using loops, logic, and arrays
- Using loops, functions, and string concatenation to assemble data and write it to text files
- Cleaning and parsing text data in VBA using functions like Trim, Left, Replace, Instr, Split...
- Using VBA to create arrays from text file data; used to load ActiveX controls

Storing Your Program Settings in the Windows Registry

- Why store your program settings in the Windows Registry?
- Using GetSetting, SaveSetting, and DeleteSetting to write and retrieve program settings in the Windows Registry

- How to stack array information in the registry and retrieve it

Day-2

Advanced Model Construction, Trade Study, and Solver Automation

- Using Conditional Formatting, logic, and VBA to auto format model layout
- Automating Data Validation to control model input
- Using worksheet events to control your model and its execution
- Controlling cell names, Excel tables, and formulas on the worksheet with VBA
- Designing Sub procedures and UDFs to calculate equations and numerical methods
- Changing model configuration / inputs / outputs on the worksheet using templates and VBA
- Uploading and downloading model parameters with Excel VBA
- Using VBA to automate trade studies and Solver on the worksheet

Advanced GUI Construction Using VBA, Sheets, Charts, Controls, Shapes, and Events

- How to create and position ActiveX controls on worksheets
- Creating event procedures for worksheet-based ActiveX controls (Click, Change...)
- Controlling worksheet-based ActiveX controls in VBA (loading combo boxes, setting scroll bars...)
- Constructing advanced UIs that respond to worksheet / workbook events like Open, Calculate,...
- Integrating VBA, ActiveX controls, Data Validation, Charts, and shapes to produce visual displays

- Using the OnKey and OnTime methods to run your code by shortcut key or at a specific time

Advanced GUI Construction Using Userforms, ActiveX Controls, and Events

- How to create userforms and place ActiveX controls, pictures, and text on them
- Launching userforms; creating a modal vs. non-modal userform
- How to create event procedures procedure for userform ActiveX controls (Click, KeyDown...)
- Using Excel VBA to load list boxes, combo boxes, and set other control values
- Reading multi-column and multi-select userform list boxes in your code
- Designing a list box or combo box to fill another list or combo box
- Designing userform based floating toolbars to run your Excel apps
- How to turn your app into an Excel Add-In

Searching for Data in Multiple Workbooks, Worksheets, and Folders

- Design strategies for naming workbooks and folders for large scale data storage and access
- Scanning for a specific dataset in open workbooks using For...Each Next loops, logic, and functions
- Scanning for a dataset on multiple worksheets using For...Each Next loops, logic, and functions
- Scanning for specific data workbooks and text files in folders using For...Each Next loops, logic, and functions

Searching for Engineering / Science Data in Workbooks, Worksheets, and Folders

- Design strategies for naming workbooks and folders for large scale data storage and access
- Scanning for a specific dataset in open workbooks using For...Each Next loops, logic, and functions
- Scanning for a dataset on multiple worksheets using For...Each Next loops, logic, and functions
- Scanning for specific data workbooks and text files in folders using For...Each Next loops, logic, and functions

Day-3

Technical Diagram Automation Using the Worksheet, Shapes, and VBA

- How to use macros to add, edit, delete, position... shapes and pictures on the worksheet
- Using the worksheet as a grid to position various engineering / science diagrams
- Using the Form shape, Line shape, Trigonometry, and VBA to draw advanced diagrams
- Controlling shape text and formats with Excel VBA
- Using VBA to assign Sub procedures to shapes and pictures on the fly
- Using VBA and logic to determine what shape button was clicked

Status Tool Design Using the Worksheet, Shapes, and VBA

- Using worksheet tables, cells, and shapes to quickly build status tools
- Tracking status info in team workbooks using headers and specific scripts

- How to easily track and organize team workbooks
- Processing status data in multiple workbooks using loops and logic
- Using worksheet tables and Excel VBA to display and color status data
- Using Excel VBA, shapes, pictures, and cells to create unique status displays, milestones, and timelines

Using SQL and ADO to Control Databases, Text files, and Workbooks

- Review of SQL and how to write a query
- How to insert, update, and delete database data using SQL
- How to use string concatenation to assemble a SQL statement in your code
- How to use ADO to query databases like Access, SQL Server, and Oracle
- How to query text files and workbooks using ADO and SQL

Intro to Controlling PowerPoint, Word, and Outlook with VBA

- Basics of automating Microsoft Word for report generation purposes
- Basics of automating Microsoft PowerPoint for report generation purposes
- Using macros to email and read emails in Microsoft Outlook